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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/694,625	10/23/2000	Kiminori Mizuuchi	10873.587US01	9089

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EXAMINER	
BATTAGLIA, MICHAEL V	
ART UNIT	**PAPER NUMBER**
2652	8

DATE MAILED: 03/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/694,625	Applicant(s) MIZUUCHI ET AL.	
	Examiner Michael V Battaglia	Art Unit 2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) *12-50* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 October 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3,4,and 6*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

This communication, dated February 20, 2004, is in response to the applicants' election. Claims 1-11 are pending.

Election/Restrictions

1. Applicant's election of Group I in Paper No. 7 is acknowledged. Claims 12-50 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 7 on the grounds that claims in Groups II and III that correspond to allowable Group I claims be reinstated.

2. The applicant's argument is not persuasive because applicant has not identified which claims in Groups II and II correspond to claims in Group 1 and why the restriction would not still be proper upon allowable subject matter being found.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aratani (US 6,030,678) in view of Yasuda et al (hereafter Yasuda) (US 6,221,455) and in further view of Kikitsu et al (hereafter Kikitsu) (US 6,240,060).

In regard to claim 1, Aratani discloses an optical information recording medium, which is recorded and reproduced by laser beams from one side (Fig. 1), comprising at least two recording layers formed of a phase change material on a substrate (Fig. 1, element 1s), wherein the recording layers include a first recording layer (Fig. 1, element 2s) and a second recording layer (Fig. 1, element 2f) from the side on which the laser beams are incident, the first recording layer is included in a first recording medium (Fig. 1, elements 2s and 3s) and the second recording layer is included in a second recording medium (Fig. 1, elements 2f and 3f), when a wavelength of a first laser beam with which recording and reproduction are performed with respect to the first recording medium is indicated as $\lambda 1$ (nm), a wavelength of a second laser beam with which the second recording medium is recorded and reproduced as $\lambda 2$ (nm), a light absorptance of the first recording layer in a crystal state as Ac (%), a light absorptance of the first recording layer in an amorphous state as Aa (%), a light transmittance of the first recording medium with the first recording layer being in the crystal state as Tc (%), a light transmittance of the first recording medium with the first recording layer being in the amorphous state as Ta (%), and the relationship between the wavelength $\lambda 1$ and the wavelength $\lambda 2$ is expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 120$ (Col. 4, line 66-Col. 5, line 14), the light transmittance of the first recording layer should be as high as possible with respect to the wavelength $\lambda 2$ in order to obtain a reproduction signal of a high quality from

the second recording layer (Col. 2, lines 6-8 and 12-15). The examiner interprets the wavelength $\lambda 1$of the first laser beam to be 655nm (Col. 5, line 11) and the wavelength $\lambda 2$ of the second laser beam to be 770nm (Col. 5, line 3). Aratani does not disclose that the first recording layer has a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength $\lambda 1$ or that the first recording medium satisfies conditions of $Tc \geq 30$ and $Ta \geq 30$ with respect to the wavelength $\lambda 2$.

Yasuda discloses an optical recording medium (Fig. 5, element 10), which is recorded and reproduced by laser beams from one side (Fig. 13), comprising at least two recording layers formed of a phase change material (Fig. 5, elements 11-12) on a substrate (Fig. 5, element 2), wherein the recording layers include a first recording layer (Fig. 5, element 12) and a second recording layer (Fig. 5, element 11) from the side on which the laser beams are incident (Fig. 13), the first recording layer is included in a first recording medium (Fig. 5, element 6) and the second recording layer is included in a second recording medium (Fig. 5, element 4). Yasuda further discloses that the first recording medium satisfies conditions of $Tc \geq 30$ and $Ta \geq 30$ with respect to the wavelength of the laser beam used to record and reproduce to and from the second recording medium (Col. 21, lines 42 and 47).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the first recording medium of Aratani to satisfy the conditions of $Tc \geq 30$ and $Ta \geq 30$ with respect to the wavelength $\lambda 2$ of the laser beam used to record and reproduce to and from the second recording medium, the motivation being to make the light transmittance of the first recording layer should be as high as possible with respect to the wavelength $\lambda 2$ in order to obtain a reproduction signal of a high quality from the second recording layer.

Kikitsu discloses a first recording layer has a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength of the laser beam that is used to record/reproduce from the first recording layer to prevent cross-erasure and reduce overwriting jitter (Col. 2, lines 20-29).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the first recording layer of Aratani to have a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength $\lambda 1$ used to record/reproduce from the first recording layer, the motivation being to prevent cross-erasure and reduce overwriting jitter in the first recording layer.

In regard to claim 4, Aratani discloses that the first recording medium (Fig. 1, elements 2s and 3s) formed on a first substrate (Fig. 1, element 1s) and the second recording medium (Fig. 1, elements 2f and 3f) formed on a second substrate (Fig. 1, element 1f) are bonded to each other (Fig. 1, element 5 and Col. 4, lines 10-15).

5. Claims 1-3, 7-8, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda in view of Hasman et al (hereafter Hasman) (US 5,526,338).

In regard to claim 1, Yasuda discloses an optical information recording medium (Fig. 5, element 10), which is recorded and reproduced by laser beams from one side (Fig. 13), comprising at least two recording layers formed of a phase change material (Fig. 5, elements 11-12) on a substrate (Fig. 5, element 2), wherein the recording layers include a first recording layer (Fig. 5, element 12) and a second recording layer (Fig. 5, element 11) from the side on which the laser beams are incident (Fig. 13), the first recording layer is included in a first recording medium (Fig. 5, element 6) and the second recording layer is included in a second recording medium (Fig. 5, element 4), when a wavelength of a first laser beam with which recording and reproduction are

performed with respect to the first recording medium is indicated as λ1 (nm), a wavelength of a second laser beam with which the second recording medium is recorded and reproduced as λ2 (nm), a light absorptance of the first recording layer in a crystal state as Ac (%), a light absorptance of the first recording layer in an amorphous state as Aa (%), a light transmittance of the first recording medium with the first recording layer being in the crystal state as Tc (%), a light transmittance of the first recording medium with the first recording layer being in the amorphous state as Ta (%), and the first recording layer has a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength λ1 (Col. 22, lines 41, 46, and 57-61) and the first recording medium satisfies conditions of $Tc \geq 30$ and $Ta \geq 30$ with respect to the wavelength λ2 (Col. 21, lines 42 and 47). The examiner notes that in the optical information recording medium of Yasuda, both λ1 and λ2 are equal to 780nm. Yasuda does not disclose that the relationship between the wavelength λ1 and the wavelength λ2 is expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 120$.

Hasman discloses an optical information recording medium, which is recorded and reproduced by laser beams from one side, comprising at least two recording layers formed of a phase change material on a substrate (Col. 8, lines 60-64), wherein the recording layers include a first recording layer and a second recording layer from the side on which the laser beams are incident, the first recording layer is included in a first recording medium and the second recording layer is included in a second recording medium (Fig. 1, element 4), when a wavelength of a first laser beam with which recording and reproduction are performed with respect to the first recording medium is indicated as λ1 (nm) (Fig. 1, element λ2), a wavelength of a second laser beam with which the second recording medium is recorded and reproduced as λ2 (nm) (Fig. 1, element λ1). Hasman further discloses that that the relationship between the wavelength λ1 and

the wavelength $\lambda 2$ is expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 120$ (Col. 4, lines 49-52). The examiner notes that Hasman uses laser beams with different wavelengths to enable parallel readout from multiple discs of the optical information recording medium (Col. 2, lines 19-21).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the first and second laser beams of Yasuda to have the relationship expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 120$ as suggested by Hasman, the motivation being to enable parallel readout from multiple discs of the optical information recording medium and greatly reduce access time.

In regard to claim 2, Yasuda in view of Hasman as applied to claim 1 meets the further limitations of claim 2. Yasuda discloses the first recording layer has a light absorption ratio Ac/Aa in a predetermined range with respect to the wavelength $\lambda 1$ (Col. 22, lines 41, 46, and 57-61) and the first recording medium satisfies conditions of $Tc \geq 45$ and $Ta \geq 45$ with respect to the wavelength $\lambda 2$ (Col. 21, lines 42 and 47). Hasman discloses a relationship between the wavelength $\lambda 1$ and the wavelength $\lambda 2$ is expressed by $10 \leq |\lambda 1 - \lambda 2| \leq 50$ (Col. 4, lines 49-52).

In regard to claim 3, Yasuda discloses that the optical recording medium further comprises a protective layer (Fig. 5, element 7), wherein the second recording medium (Fig. 5, element 4), the first recording medium (Fig. 5, element 6), and the protective layer (Fig. 5, element 7) are formed on the substrate (Fig. 5, element 2) sequentially, the protective layer has a thickness d1 (um) in a range of $30 \leq d1 \leq 200$ (Col. 6, lines 5-6), and recording and reproduction are performed with the first and second laser beams from a side of the protective layer (Fig. 13).

In regard to claim 7, Yasuda discloses that a condition of the light absorption ratio Ac/Aa ≥ 1.0 in the first recording layer is satisfied with respect to the wavelength $\lambda 1$ (nm) of the first laser beam (Col. 22, lines 41, 46).

In regard to claim 8, Yasuda discloses that the first recording layer contains Ge-Sb-Te (Col. 9, line 61-Col. 10, line 9).

In regard to claim 10, Yasuda discloses that the first recording layer has a thickness d2 (nm) in a range of $3 \leq d2 \leq 12$ (Col. 14, lines 52-53).

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aratani in view of Yasuda in further view of Kikitsu as applied to claim 1 above, and further in view of Welch et al (hereafter Welch) (US 5,384,797).

Aratani in view of Yasuda in further view of Kikitsu discloses the optical information recording medium of claim1 wherein recording and reproduction are performed with a first laser beam and a second laser beam with different wavelengths. Aratani in view of Yasuda in further view of Kikitsu does not disclose that the first laser beam and a second laser beam are emitted from a multiwavelength light source in which a part of an optical waveguide of a second harmonic generation element and an optical waveguide of a semiconductor laser are optically coupled.

Welch discloses a multiwavelength light source (Col. 2, lines 62-63) in which a part of an optical waveguide of a second harmonic generation element (Fig. 1, elements 15 and 23; Col. 6, lines 62-63; and Col. 7, line 63-Col. line 4) and an optical waveguide of a semiconductor laser (Fig. 1, element 19) are optically coupled (Fig. 1). Welch discloses that second harmonic generation is an efficient way to double frequency, thereby producing laser beams with different wavelengths.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to produce the first and second laser beams for recording and reproducing in the optical information recording medium of Aratani in view of Yasuda in further view of Kikitsu with the multiwavelength light source of Welch in which a part of an optical waveguide of a second harmonic generation element and an optical waveguide of a semiconductor laser are optically coupled, the motivation being to efficiently produce multiple wavelengths.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda in view of Hasman as applied to claim 1 above, and in further view of Imaino et al (hereafter Imaino) (US 5,555,537).

Yasuda in view of Hasman discloses an optical information recording medium according to claim 1. Hasman mentions use of a 427nm laser beam (Col. 4, lines 40-46) and teaches that any suitable assembly of light sources may be used (Col. 4, lines 49-50) with the optical information recording medium capable of parallel readout. Yasuda in view of Hasman does not disclose that the wavelength $\lambda 1$ (nm) of the first laser beam is in a range of $390 \leq \lambda 1 \leq 520$.

Imaino suggests use of a laser beam with a wavelength $\lambda 1$ in the range of $390 \leq \lambda 1 \leq 520$ and teaches that recording density is increased by shortening the wavelength of a laser beam, which reduces the spot size of the laser beam (Col. 7, lines 46-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to shorten the wavelength $\lambda 1$ of the first laser beam of Yasuda in view of Hasman to a range of $390 \leq \lambda 1 \leq 520$ as suggested by Imaino, the motivation being to reduce the spot size of the first laser beam and increase the recording density of the first recording medium.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda in view of Hasman as applied to claim 1 above, and further in view of Akahira et al (hereafter Akihira) (US 5,527,661).

Yasuda in view of Hasman discloses an optical information recording medium according to claim 1. Yasuda in view of Hasman does not disclose that the first recording layer contains Ge-Sb-Te-Sn.

Akahira discloses a phase change information layer made of Ge-Sb-Te-Sn and teaches that Ge-Sb-Te-Sn is a chalcogenide compound that will change in structural phase between an amorphous state and a crystalline state (Col. 8, lines 8-14).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Ge-Sb-Te-Sn for the first recording layer of Yasuda in view of Hasman as suggested by Akahira, the motivation being to use a material that changes structural phase between an amorphous state and a crystalline state to record information.

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aratani in view of Yasuda in further view of Kikitsu as applied to claim 1 above, and further in view of Moriya et al (hereafter Moriya) (US 5,726,969).

Aratani discloses that the first recording medium (Fig. 1, elements 2s and 3s) includes at least the first recording layer (Fig. 1, element 2s) and a reflective layer (Fig. 1, element 3s) formed sequentially on the substrate (Fig. 1, element 1s), and the reflective layer has a thickness d3 (nm) in a range of $d3<22$ (Col. 5, lines 66-67). Aratani in view of Yasuda in further view of Kikitsu does not explicitly disclose that the reflective layer has a thickness in the range of $2 \leq d3 \leq 20$.

Moriya discloses an optical information recording medium that includes a first recording medium (Fig. 1, element 102) and a second recording medium (Fig. 1, element 103) with phase change recording layers (Col. 2, lines 55-56) wherein the first recording medium (Fig. 1, element 102) includes at least the first recording layer (Fig. 1, element 105) and a reflective layer (Fig. 1, element 106) formed sequentially on the substrate (Fig. 1, element 104), and the reflective layer has a thickness d3 (nm) in a range of $2 \leq d3 \leq 20$ (Col. 4, lines 28-29). Moriya discloses that the thickness is set so that the reflecting layer will reflect enough light to read the first recording layer while transmitting enough light to read the second recording medium (Col. 4, lines 20-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the recording layer of Aratani in view of Yasuda in further view of Kikitsu in the range $2 \leq d3 \leq 20$, where d3 is the thickness of the reflecting layer in nanometers, the motivation being to set the thickness so that the reflecting layer will reflect enough light to read the first recording layer while transmitting enough light to read the second recording medium.

Citation of Relevant Prior Art

10. Kasami et al (US 6,312,780) discloses a phase change optical disc with a light transmitting layer that doubles as a protective layer and teaches that reducing the wavelength of a laser beam will reduce spot size and increase recording density (Fig. 10 and Col. 1). Ko (US 6,343,060) discloses an optical recording medium having two recording layers and an adhesive layer that uses different laser beams to read the different recording layers where the wavelengths meet the range $10 \leq |\lambda 1 - \lambda 2| \leq 50$ (Col. 5). Kaneko et al (US 5,766,717) discloses discloses an optical recording medium having two recording layers that uses different laser beams to read the different recording

layers where the wavelengths meet the range $10 \leq |\lambda 1 - \lambda 2| \leq 120$. Yasuda et al (US 6,511,788) discloses a phase change optical disc with two recording layers where the first recordin layer has transmittance and absorptance parameters for amorphous and crystal states that meet the limitations of the claims (Col. 17).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V Battaglia whose telephone number is (703) 305-4534. The examiner can normally be reached on 5-4/9 Plan with 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael Battaglia

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W. R. YOUNG
PRIMARY EXAMINER